Montgomery County, Maryland Police Department
Spatial Crime Analysis System Project
Three Month Review
December 4, 1997

Developed and Implemented by the:
U.S. Department of Justice
Criminal Division
Office of Administration
Geographic Information Systems Staff

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Background

On April 1, 1996, the Criminal Division and the National Institute of Justice (NIJ), United States Department of Justice, and the Montgomery County Police Department (MCPD) signed a partnership to develop and implement a spatial crime analysis system at the MCPD. The goal was to improve MCPD's tactical and strategic responses to crime by focusing on spatial crime analysis, improve MCPD's reporting capabilities, and facilitate the sharing of crime data, maps, tabular reports, and histograms (time charts) throughout the MCPD.

The MCPD will benefit greatly from the close partnership between the Criminal Division and NIJ. The Criminal Division Geographic Information Systems (GIS) Staff has a vast amount of experience in developing spatial crime analysis systems for use by police departments. The NIJ specializes in awarding and monitoring federal grants. Working together, the Criminal Division and NIJ were able to identify the GIS and crime analysis needs of MCPD, which had previously applied for federal assistance, develop and deliver a spatial crime analysis system, and monitor the implementation and use of the system over time.

It is important to note that the Criminal Division's Spatial Crime Analysis System (SCAS) was developed for use by MCPD crime analysts, who are located at MCPD headquarters and at each of the five police districts. Each crime analyst received Windows 95, Microsoft Access, ArcView, and SCAS training. The Criminal Division's task was to develop an ArcView application that would improve the crime analysis capabilities of all analysts, and free up more time for crime analysis by automating crime analysis and report generation functions.

Prior to this project, the amount of the analysts' computer and crime analysis experience varied greatly. Further, crime analysts at headquarters and each of the five MCPD police districts maintained disparate crime databases. The Crime Analysis Section did not have a central database or computer network. Each crime incident database varied in both structure and data entry standards. Data sharing was problematic. Without direct access to crime data from another district, it was extremely difficult to query, analyze, and report on crimes that occurred out of one's own district, in an effort to identify crime trends. Therefore, while the Criminal Division GIS Staff developed the SCAS, the MCPD implemented a local area network and developed a central crime database for all analysts to use. The central database forced crime analysts to define and adhere to data entry standards. With new data entry standards and database standards established, the Criminal Division and MCPD looked to the SCAS to define internal crime analysis standards.

In order to gauge the utility of the SCAS, it is very important to monitor the SCAS usage during the life of this project. Therefore, the Criminal Division GIS Staff implemented an automated log that records the work that is performed during each SCAS session. The log records the length of time the SCAS is active, the types of queries and automated reports that are run, and the number of times each crime analysis tool is used. This paper provides a summary of the observations and conclusions of the SCAS implementation and the SCAS usage for the first three months. A meeting will be scheduled with the MCPD crime analysts to review the preliminary findings and generate more personal, subjective feedback. At this meeting, MCPD crime analysts will be asked for their perceptions of the SCAS's advantages and disadvantages, and for any suggestions for improvement.

Over time, it is anticipated that MCPD crime analysts will gain confidence in the SCAS and its capabilities. The Criminal Division and NIJ will perform a nine-month review the MCPD SCAS usage using the same method used for this three-month review. The Criminal Division and the NIJ are also interested in monitoring the degree to which MCPD shares the SCAS technology with the rest of the MCPD.

Pre-Implementation Hurdles

The Criminal Division GIS Staff and MCPD faced several challenges during the pre-implementation phase of this project. These challenges were both logistical and non-personnel related. They included the following:

Table 1

Computer Network	Prior to this project, MCPD's crime analysts primarily operated independently of one another, as there was not a computer network that connected the crime analysts.
Database Administration	Prior to this project, • Analysts at each of the five districts and at headquarters maintained their own crime database – there was not a central crime database; • Each crime analyst's database had a different structure; and • No data entry standards existed among the databases. (Databases were mostly comprised of Part I offenses. Crime analysts would fairly consistently include Part I offenses and would use personal discretion in including Part II offenses in their databases – Part II offenses were included only if they were deemed relevant). In order to rectify the problems surrounding the crime databases, MCPD consulted with the Criminal Division GIS Staff and then developed a centralized crime incident database that is strongly suited for crime analysis and accessible through the network.
System Administration	Several network connectivity and system administration concerns arose as the new crime analysis network was put in place. These concerns were handled primarily by the MCPD computer staff, with some consultation by the Criminal Division GIS Staff. Network administration and hardware problems created user frustration, especially in the Rockville and Bethesda districts. The biggest problem is the speed of the network.
Software and Programming Bugs	ArcView, Avenue, and SCAS programming bugs at times added to user frustration. In response, the Criminal Division GIS Staff created "error logs" for analysts to complete and fax to the Criminal Division GIS Staff. The error logs describe the type of error and the type or query or process that was running when the error occurred.

As shown above, the Criminal Division GIS Staff and MCPD met several challenges before and while implementing the SCAS. Another challenge was related only indirectly to the hardware and software available to the crime analysts - how do we encourage the use of the SCAS? Prior to this project, it was noted that analysts differed greatly in:

1. Crime analysis training and proficiency;
2. General computer literacy - all were new to GIS and **spatial** crime analysis (some were fairly new to crime analysis in general),
3. Professional and personal interest, and
4. Perceptions of the role of crime analysts (printing reports or simple maps versus actual crime analysis to improve the tactical and strategic operations).

Once the SCAS and the computer network were up and running, it became clear that these four factors directly influence the amount of SCAS usage, as demonstrated in the **SCAS Usage** section below.

The Goals of the SCAS Project

Prior to implementing the SCAS, MCPD completed a brief survey regarding the crime analysts' current data sources and database formats, the types of output that are produced, for whom the output is produced, and how the output is used by the rest of MCPD. The goal of the survey was to get a general feel for the way MCPD crime analysts conduct business. The Criminal Division GIS Staff's goal, as stated earlier, is to improve the crime analysis capabilities of all crime analysts by developing automated crime analysis tools, thereby freeing up more time for analysis. The information below summarizes MCPD's anticipated use of the SCAS.

The GIS could improve the Montgomery County Department of Police's current operations by providing or improving our ability to:

- *Identify crime hot spots,*
- *Quickly identify existing or evolving crime patterns and series,*
- *Perform statistical analysis to aid in the forecasting of crime,*
- *Display data in a way that would allow for the quick identification of relationships between crimes and/or suspects,*
- *Produce maps for tactical and strategic applications, and*
- *Produce mapping products for crime prevention, community services, and dissemination of information to the general public.*

The degree to which the Criminal Division GIS Staff and the MCPD realized these goals is discussed in the **SCAS Usage** section listed below.

SCAS Usage

SCAS usage varied greatly among MCPD's five police districts and at headquarters. The Criminal Division GIS Staff anticipated that the amount SCAS usage and types of SCAS tools used would vary according to the numbers and types of crimes. It was assumed that a greater number of crimes would provide a greater sample size to query and on which to perform statistics, which would in turn lead to greater SCAS usage. Although this hypothesis held true among the district analysts, as displayed in **Table 2**, the SCAS generally was used more often by analysts at headquarters than analysts in the five police districts (as measured in the number of times the crime analysts used the Primary Query Tool, the number of times analysts logged into the SCAS, and amount of time spent "on-line"). The crime analyst in Germantown was the exception to this general rule, using the SCAS the most of any crime analyst.

Table 2

A District	B Number of Crimes per District	C Ranking Value: Number of Crimes per District (1 = most crime, 5 = least crime)	D Ranking Value: Use of Primary Query Tool (1 = used most often, 5 = used least often)	E Ranking Value: Use of Other SCAS Crime Analysis Tools (1 = used most often, 5 = used least often)
Germantown	1,870	1	1	1
Silver Spring	1,716	2	2	2
Wheaton	1,446	3	3	3
Bethesda	888	4	4	5
Rockville	818	5	5	4

Table 2 suggests that, among the districts, the greater the amount of crime (column B), the greater the use of SCAS Primary Query Tool (column D). (The SCAS Primary Query Tool is used to produce a "Result" theme, which is the selected set of crimes, that is used with the crime analysis tools.) Similarly, the amount of crime is also directly related to amount of crime analysis tool use, although not as strongly related. The districts that ranked first, second, and third in the number of crimes also ranked first, second, and third in the number of times crime analysis tools were used. However, the district ranked fourth in the amount of crime ranked fifth in the number of times the crime analysis tools were used, and the district ranked fifth in crime ranked fourth in the number of times the crime analysis tools were used.

Using ranking values to singularly compare the amount of crime in a district and the volume of crime analysis tool usage, however, can be misleading. Please refer to the chart titled "MCPD SCAS Crime Analysis Tool Summary" (Table 4). You will note that the analyst in Germantown used the SCAS crime analysis tools the most by a great margin, yet the Germantown district had only slightly to moderately more crime than the Silver Spring and Wheaton districts. SCAS crime tool usage in Silver Spring and Wheaton were comparable to one another, but the analysts in these districts did not used the SCAS nearly as much as the analyst in Germantown. (SCAS crime tool usage in Rockville and Bethesda were almost negligible, largely because of hardware and network problems.)

Similarly, the high crime Germantown district also had the greatest number of queries using the Primary Query menu. The Silver Spring, Wheaton, and Bethesda districts **showed similar amounts of use**, ranking second, third and fourth, respectively, **but had crime volumes that varied greatly** during the three month period - 1,716; 1,446; and 888 crimes recorded in the SCAS, respectively. Thus, the amount of crime alone does not determine the amount of SCAS crime analysis tools usage or Primary Query tool usage; there are no causal relationship between the amount of crime per district and the amount of SCAS usage.

So what determines how often the SCAS is used? SCAS usage rate was directly related to three factors:

1. Level of prior crime analysis expertise,
2. Prior amount of computer training and computer use, and
3. Personal and professional desire.

Analysts with the most previous computer experience and crime analysis experience used the SCAS more frequently, used SCAS crime analysis tools more often, and remained logged onto the system the longest. (Note: All MCPD analysts were trained until they said that there were comfortable with the SCAS, and each analyst remains aware that he/she may receive additional training at any time, at no cost to MCPD.) This conclusion was drawn from the number and types of questions posed by the crime analysts, the amount of previous crime analysis and computer training, and the recorded SCAS usage rates.

The identification of these three factors is very important because these factors may be easily addressed by management techniques, in an effort to improve overall crime analysis performance and SCAS usage. First, the level of crime analysis expertise can be improved through additional training and through the aid of developmental projects. For instance, because MCPD wanted to increase the productivity of several of its district crime analysts, MCPD management implemented a solution whereby analysts must complete weekly crime analysis projects that require extensive use of the SCAS. Second, the amount of computer use can be increased by additional training or through assigned weekly projects, as mentioned above. Third, management may influence the degrees of personal and professional desire through appropriate systems of awards and incentives. The three factors are very important to recognize while planning the implementation of the SCAS, or any other crime analysis software. The degree of immediate success, and likely future success, is contingent upon the prior amount of experience of the users.

It is also important to address factors that detracted from the amount of SCAS usage during the first three months. Problems with the network, hardware, software, and SCAS caused the SCAS to be "off-line" at times. In response to the MCPD analysts' concerns about the reliability of the network and/or

SCAS, the Criminal Division GIS Staff implemented an error log system to determine the cause of any disturbances while using the system. At the time of a hardware/software problem, the user records exactly what process was being performed when the error message was received, if any. After completing the form, the user faxes the error log to the Criminal Division GIS Staff, which then attempts to provide a solution to the problem. Unfortunately, because the Criminal Division is not on site, it sometimes is not clear whether a given problem is caused by the network, a lack of synchronization between the databases, or by a software or programming bug. The error logs and special attention to the hardware and software have helped to steadily decrease the number of problems over time.

The use of error logs represents the Criminal Division's and MCPD's mutual desire to fully address the needs of the crime analysts and fulfill each party's commitment to the successful implementation of the SCAS. The mutual desire to improve the crime analysis capabilities of the crime analysts is supported through conversations with Sergeant Thomas Didone, head of the Crime Analysis Section, and the analysts themselves. The crime analysts provide valuable feedback by expressing interest in expanding the number and types of tools in the SCAS. In addition, the crime analysts have requested, and will receive, group follow-up training. The combination of training and assigned projects will serve to greatly improve the crime analysts' spatial crime analysis capabilities.

The following three tables summarize the amount of SCAS usage during the first three months. The Criminal Division GIS Staff will compare these three tables with those produced from the end of the nine-month review to identify changes. The Criminal Division GIS Staff will also complete more involved analysis of the SCAS usage. With more regular use of the SCAS by MCPD analysts, the GIS Staff will, for example, be able to closely compare the number and types of crimes with the number and types of crime queries and crime analysis tools used. Such an analysis at this time would be premature.

Table 3

Montgomery County Police Department
Reported Crimes During First Three Months[1]
May 14 - August 14, 1997[2]

Class Code	Bethesda	Germantown	Rockville	Silver Spring	Wheaton	Total
Part I Offenses						
Homicide	-	2	-	1	1	4
Rape	3	20	4	16	16	59
Robbery	29	46	22	91	74	262
Aggravated Assault	21	46	31	61	54	213
Burglary	189	392	220	298	298	1,397
Larceny	472	918	412	782	617	3,201
Auto Theft	97	294	95	323	202	1,011
Arson	-	-	-	1	-	1
Part II Offenses						
Assault	2	2	-	2	1	7
Forgery - Counterfeiting	-	1	-	-	-	1
Bad Checks - Theft	-	-	-	-	-	-
Embezzlement - Theft	2	1	-	1	-	4
Stolen Property	-	-	-	-	-	-
Vandalism	4	-	-	-	2	6
Weapons	6	17	3	8	11	45
Prostitution-Vice	-	-	-	-	-	-
Sex Offense	24	69	17	34	37	181
Narcotics	-	-	-	-	-	-
Gambling	-	-	-	-	-	-
Family Offenses	-	5	-	7	15	27
Juvenile Offenses	-	-	-	-	-	-
Liquor Law Violations	-	-	-	-	-	-
Contributing	-	-	-	-	-	-
Disorderly Conduct	-	1	-	-	-	1
Suicide	-	-	-	-	-	-
Non-Traffic Offenses	3	3	7	2	10	25
Misc. Traffic Offenses	-	-	-	-	-	-
Miscellaneous Calls	29	52	4	75	108	268
Deer Complaints/Concerns	-	-	-	-	-	-
Hunting Complaints	-	-	-	-	-	-
Traffic Accidents	-	-	-	-	-	-
Crime Class not entered	7	1	3	14	-	25
Total	888	1,870	818	1,716	1,446	6,740

[1] The MCPD crime incident database is almost exclusively Part I offenses; selected Part II offenses are also included.

[2] The May 14 - August 14, 1997 date range reflects a three-month time period the SCAS was used by the MCPD. As of August 14, the SCAS main incident table was comprised of approximately 45% historical data. The figures in this table include the historical data.

Table 4

MCPD SCAS Crime Analysis Tool Summary
First Three Months, Ending August 14, 1997
Excludes Criminal Division GIS Staff Training

DESCRIPTION	HQ	HQ	HQ	HQ	HQ	SID	B	G	R	SS	W	Total
Usage												
Login	150	9	69	78	60	39	61	182	7	33	42	730
Logout	131	4	49	40	58	28	40	116	8	12	29	515
Min Login Time	-	9	-	-	-	-	1	-	-	1	1	12
Max Login Time	167	222	1,118	294	354	59	248	151	79	90	108	2,890
Avg Login Time	29	76	57	28	24	11	39	23	13	25	17	342
Crime Analysis												
Custom Query	58	9	89	65	34	11	33	129	9	44	35	516
Change Map	-	-	7	2	2	-	-	7	-	9	3	30
Density Grid	19	1	1	3	4	2	-	4	-	1	2	37
Hot Spots	33	2	-	6	2	4	-	2	-	2	4	55
Vectorize HotSpots	1	1	-	2	1	-	-	1	-	1	1	8
Std. Dev. Ellipses	14	1	1	6	4	-	1	6	-	1	1	35
Ellipses within HotSpots	-	-	-	-	-	-	-	-	-	-	-	-
View Suspects	-	3	2	3	4	1	-	23	-	-	5	41
Suspect/Incident Lines	-	-	-	-	-	-	-	6	-	-	-	6
View Suspects in SDE Rings	-	1	-	1	-	-	-	1	-	1	-	4
Connect Vehicle Theft Site w/ Recov.	1	3	-	2	3	2	-	20	-	1	1	33
Select by Street	3	1	-	1	-	-	-	2	-	-	-	7
Select by Poly	2	1	-	3	1			4	3	1	1	6
Show Add'l Info	6	6	3	9	16	2	1	22	6	10	2	83
Radii	5	1	-	4	2	-	-	3	-	-	1	16
Point Count	2	1	-	5	2	-	-	9	-	1	-	20
Pin Map	-	-	-	-	-	-	-	-	-	1	3	4
MatchCoo	1	-	-	1	1	-	-	43	-	2	-	48
UnGeocode	-	-	-	-	-	2	-	-	-	-	-	2
Automated Map/ Report Generation												
Beat Map	10	-	17	4	1	1	2	1	-	-	-	36
D/W/M Maps/Reports	23	-	1	3	3	1	-	7	-	2	1	41
Chart Trends	-	2	4	3	4	-	-	15	-	2	1	31

Table 5

Primary Query Tool
Frequency of Use
By District and Crime Type
First Three Months, Ending August 14, 1997
Excludes Use During Criminal Division GIS Staff Training

Crime Type	HQ	HQ	HQ	HQ	HQ	SID	B	G	R	SS	W	TOTAL
Part I Offenses												
Homicide	-	-	2	4	-	-	3	1	-	3	-	13
Rape	-	-	9	8	2	-	11	-	-	5	-	35
Robbery	6	1	42	22	11	4	15	1	-	6	3	111
Aggravated Assault	-	-	4	13	1	1	2	1	-	2	2	26
Burglary	19	2	16	22	5	4	23	59	5	5	7	167
Larceny	3	2	1	11	12	-	8	11	1	3	9	61
Auto Theft	3	4	3	20	7	3	8	26	-	1	10	85
Arson	-	-	-	-	-	-	-	-	-	-	-	-
Part II Offenses												
Assault	-	-	-	3	-	-	2	-	-	-	1	6
Forgery Counterfeiting	-	-	-	-	-	-	-	-	-	-	-	-
Bad Checks Theft	-	-	-	-	-	-	-	-	-	-	-	-
Embezzlement Theft	-	-	-	-	-	-	-	-	-	-	-	-
Stolen Property	-	-	-	-	-	-	-	-	-	-	-	-
Vandalism	-	-	-	-	-	-	-	-	1	-	3	4
Weapons	-	-	-	1	-	-	-	-	-	-	-	1
Prostitution Vice	-	-	-	-	-	-	-	-	-	-	-	-
Sex Offense	-	-	-	1	1	-	1	1	-	-	-	4
Narcotics	-	-	-	-	-	1	-	-	-	-	-	1
Gambling	-	-	-	-	-	-	-	-	-	-	-	-
Family Offenses	-	-	-	-	-	-	-	-	-	-	-	-
Juvenile Offenses	-	-	-	-	-	-	-	-	-	-	2	2
Liquor Law Violations	-	-	-	-	-	-	-	-	-	-	-	-
Contributing	-	-	-	-	-	-	-	-	-	-	-	-
Disorderly Conduct	-	-	-	-	-	-	-	-	-	-	-	-
Suicide	-	-	-	-	-	-	-	-	-	-	1	1
Non-Traffic Offenses	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Traffic Offenses	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Calls	-	-	-	2	1	-	1	-	-	-	-	4
Deer Complaints/Concerns	-	-	-	-	-	-	-	-	-	-	-	-
Hunting Complaints	-	-	-	-	-	-	-	-	-	-	-	-
Traffic Accidents	-	-	-	-	-	-	-	-	-	-	-	-
Total	31	9	77	107	40	13	74	100	7	25	38	521

Success Stories During the First Three Months

The Criminal Division GIS Staff was careful to keep the three-month review of MCPD SCAS usage to an objective basis. In doing so, the GIS Staff was able to effectively measure the frequency of SCAS usage and the frequency of SCAS tool usage. However, although the goal of the SCAS project at MCPD was to improve the crime analysis capabilities of the crime analysts, the GIS Staff also sought to improve the crime analysts' perceptions of their careers and the value of the services they provide. One way to gauge the effectiveness of this initiative is to ask the crime analysts directly how the SCAS helped them in their daily duties. The crime analysts' SCAS "success stories" are included below, in their own words.

Bethesda

In June of 1997 the Bethesda District suffered a vehicle theft and theft from vehicle pattern in a 15 block area of Chevy Chase, east of Connecticut Avenue. The Sergeant ,who is the Delta-1 (D-1) beat manager, came to me and requested a map and information detailing the most frequent days of occurrence and times of occurrence. The SCAS enabled me to provide information to assist in the deployment of officer to observe the area. An arrest was made within one week of the start of the detail, effectively ending the theft pattern.

Germantown

This district has been the most successful SCAS user. The SCAS was used to:

- *Help identify the relationship between auto thefts and thefts from autos for a joint project between the Auto Theft Unit and Germantown Investigations. The officer from Auto theft was also impressed with the recovery location link lines.*
- *Identify hot spots for the commercial burglary pattern occurring County-wide and directed Germantown SAT surveillance's.*
- *Complete bi-weekly reports, which are distributed to all Germantown Units and Gaithersburg city. The reports include maps indicating hot spot PRA's and crimes by classification. Germantown Beat teams use this product to direct patrol.*
- *Complete large bi-weekly maps for the roll-call room depicting crimes by classification.*
- *Complete a map for "Community Day" at the academy. The map displayed important crime point information.*
- *Produce maps that accompany all Crime Alerts. These maps include crime by classification, recovery locations, and suspect address linked to the crimes.*

HQ1

In July of 1997, the Department implemented a redistricting plan where the geographic boundaries of the five district stations where changed. Our Director of Policy & Planning Division, who developed these changes using an ARC/Info program, was out of town at a GIS conference during the first week of the program's implementation. Using the SCAS program, I was able to produce several basic maps of the new district boundaries for officers to use in Roll Calls rooms and on the street.

HQ2

In August 1997, a task force was formed to deal with a burglar utilizing channel locks to enter commercial establishments spanning three different police districts. Skip Baylor and I created a table within ArcView to include each offense attributed to the suspect(s), which was updated frequently as offenses continued to occur. A total of 66 events are now included in the table which was used to create and update maps depicting not only the location of events, but color coding the month of occurrence and showing their southerly progression within the county. A standard deviation map was prepared as well. Unfortunately, the suspect is still at large.

HQ3

Over the past 3 months I have had an opportunity to use the SCAS, created by the Department of Justice, to create maps to complement analysis packages provided to department personnel. Specifically, maps have been produced to identify patterns associated with a series of burglaries where the perpetrators used channel locks to gain entry into commercial establishments. Since the incidents continued to occur over a period of several months, crime points on the maps were color-coded to allow the reader to quickly identify which events were related to a specific period of time. Over 60 incidents were used to show not only the locations of events but also the migration [movement pattern] of the events. Standard deviation ellipses were used to show where the highest concentration of incidents were occurring. A task force was created to address the continuing crime series and utilized the maps as a part of their daily briefings.

Personnel assigned to the Crime Analysis Section participated in a joint investigative/tactical effort, with numerous outside agencies, to combat a continuing crime series involving South American jewelry thieves. Once again, maps were created to complement analysis packages used in the joint effort. Montgomery County had experienced, over the past 3 years, more incidents involving the South American jewelry thieves than any other jurisdiction in the state. Thus, having the ability to graphically illustrate all of the crime events and to further distinguish the robberies from thefts was a tremendous benefit.

Wheaton

PO3 Steve DeCarlo came to me to request information on crimes that surround the Wheaton Shopping Center (11409 Georgia Avenue). He was assigned a project by Lieutenant Walker, generated by a complaint by the manager of Wheaton Shopping Center on a perceived high rate of crime. I used our Crime Analysis Tactical Database, and ran a printout of all crimes occurring in the surrounding PRA's (police reporting areas). Officer DeCarlo was able to use this to determine exactly where and when crimes were occurring. I also used the SCAS, and printed 2 maps for him; one covering April 1 to August 31, 1997, and one covering April 1 to September 14, 1997. Officer DeCarlo felt that this was a very good tool to actually show where the crimes were occurring.

Special Investigations Division

Because the current interface addresses only the Crime Analysis database, which does not contain drug related data, I have not had an opportunity to practically apply its capabilities. However, I have imported Gang-related data into ArcView. Having an established MCPD-View [part of the SCAS] was definitely a time saver. Also, I really appreciated having a pre-established layout to print form.

Requests for Additional Crime Analysis Functions

The Criminal Division continues to develop the SCAS by applying concepts from the field of crime analysis, conclusions from crime research, management's reporting requirements, and knowledge gained by police officers and police supervisors. This is an on-going process. The Criminal Division GIS Staff will continue to provide follow-up training to the MCPD crime analysts as needed. As part of the

training session, the MCPD crime analysts will be asked to complete a brief survey that addresses questions similar to the questions listed below:

- What are the crime analysts' impressions of how the SCAS has changed their daily activities, including the allocation of time to old and new tasks?
- What do the crime analysts like about the SCAS? Why?
- What do the crime analysts dislike about the SCAS? Why?
- Do the crime analysts have any requests for new crime analysis tools?
- Do the crime analysts have any requests for modifications to current SCAS tools?
- Do the crime analysts feel that the Criminal Division GIS Staff and MCPD have appropriately addressed any network and SCAS problems and solutions? If not, why?
- Has the SCAS changed to the degree to which crime analysts' output is distributed among the MCPD? How?
- Do the crime analysts feel that it is important to distribute the maps, reports, and charts throughout MCPD? Do they have any recommendations to increase the distribution?

Advice for Police Departments New to Spatial Crime Analysis or GIS

Using the SCAS product development and implementation as a learning experience, the Criminal Division GIS Staff has prepared an "advice column" for police departments that plan to implement GIS or spatial crime analysis.

1. Clearly define the purpose of your crime mapping system.
    - Who are the intended users of your crime mapping system? Crime analysts, officers, and management all have different needs. Does your crime mapping system address these needs?
    - Is the crime mapping system's ease of use commensurate with the level of computer experience of its users?
    - Will your crime mapping application:
        - Perform crime analysis?
        - Automate mapping and reporting?
        - Produce simple crime location maps?

2. Determine which data will be available for querying with your crime mapping system.
    - What type of data will you use?
    - Will you include both Part I and Part II offenses, as required using the National Incident Based Reporting system (NIBR's)?
    - Is your database suitable for crime analysis? For example, does it have appropriate suspect data (e.g. name, addresses, descriptive physical information, and modus operandi), arrest data, field interview data, and auto theft and recovery address data?

3. Determine the type of geographic data will be used with your crime mapping system.
    - Roads, water boundaries, train tracks
    - Police boundaries - districts, beats, police reporting areas,
    - Neighborhood and community association boundaries,
    - Planimetric - land parcels, light poles, fire hydrants, manhole covers, and
    - Aerial photographs

4. Before implementing GIS, determine the crime analysis capabilities of your crime analysts and/or officers.

5. Set goals for crime analysis training improvements.

6. Require **Productive Training** to help the crime analysts learn spatial crime analysis:
    - Develop small, medium, and large projects for the analysts to complete on a timely basis (e.g. weekly) immediately after the spatial crime analysis system is implemented.
    - For each crime analysis tool or function,
        - Explain its purpose to crime analysis,
        - Explain its importance to crime analysis, and
        - Advise who would want the printed output.
    - Require the user to deliver the output to the identified recipient. Generally, the recipient will ask for similar output again, or will provide input for future requests.

7. Regularly measure the use of the crime mapping system and request feedback for improvements from users. Automated user logs are useful, but sometimes difficult for users to initially accept if they are aware of them.

8. Train, train, train.

9. Develop a plan to market the system's benefits to your colleagues in other units/branches/divisions and to management. Use GIS to:
    - Increase the demand for maps within the department,
    - Produce daily Roll Call maps,
    - Make maps for the Chief and his/her command staff,
    - Meet with other units/branches and management, and
    - To the extent possible, invite other branches and units to use your crime mapping system to perform analysis (suspect, theft site, recovery site, etc.) or to print simple maps showing the date, time, and locations of crimes.

10. If you are in a managerial role, you must:
    - Monitor the crime analysts' and officers' progress closely;
    - Provide training and support at every opportunity;
    - Allow 3-6 months for a learning curve and for adjustment to the new tasks, and potentially, a new way of doing business;
    - Interview officers, management, detectives, and other specialists for input and concerns;
    - Listen to the users; and
    - Prevent unnecessary user frustration:
        - Ensure the application is relatively bug-free, and
        - Ensure short query times by monitoring and improving your network and crime databases.

Where Do We Go From Here?

During the next review period (a nine-month review), the Criminal Division GIS Staff and the MCPD will concentrate on SCAS "reinforcement" training and will focus on expanding the use of the SCAS within MCPD. The speed of MCPD's Local Area Network (LAN) is expected to improve dramatically during the summer of 1998, when MCPD fully converts to a fiber optic network. The improved speed of the network is expected to increase SCAS usage throughout MCPD. Specifically, the Criminal Division GIS Staff and MCPD will focus on four areas:

1. **General SCAS Usage**. The tables included in this report reveal a need for additional SCAS training. Lessons learned during training will be reinforced through supplemental mapping projects assigned by the Crime Analysis Section supervisor. The mapping projects are aimed

at improving the level of crime analysis and increasing the amount of use of the automated report generation tools, such as the Daily/Weekly/Monthly Report Generator and the Crime Alert tool.

2. **Computer Aided Dispatch (CAD) Data**. The Crime Analysis Section is working with the MCPD Department of Information to transfer CAD data from the MCPD mainframe to a Microsoft Access database stored on the MCPD LAN. The CAD data includes all of the calls for service in the county. The CAD data will be queried through the SCAS and is expected to improve MCPD's ability to conduct crime analysis.

3. **Field Interview Reports (FIR) Data**. By January 1, 1998, all of MCPD's Field Interview Reports will be entered into a central MS Access database stored on the LAN. These reports often provide possible suspect information for unidentified crimes.

4. **Central Auto Theft Team (CATT).** The majority of auto theft investigations and analysis have historically been conducted by the CATT, which works in a remote site within the county. The CATT has requested a copy of the SCAS and has expressed an interest in working more closely with the Crime Analysis Section. The MCPD is currently investigating how to share the SCAS with other units in MCPD.

During the next review period, the Criminal Division GIS Staff and MCPD will continue to work closely to develop new crime analysis tools. The Criminal Division GIS Staff and MCPD have noticed a recent, positive change in the crime analysts' perception of the SCAS and its usefulness in completing crime analysis. This is evident in MCPD's interest in obtaining and using additional sources of crime data and actions taken to share the SCAS with other staffs within MCPD.